



Fig. 5a

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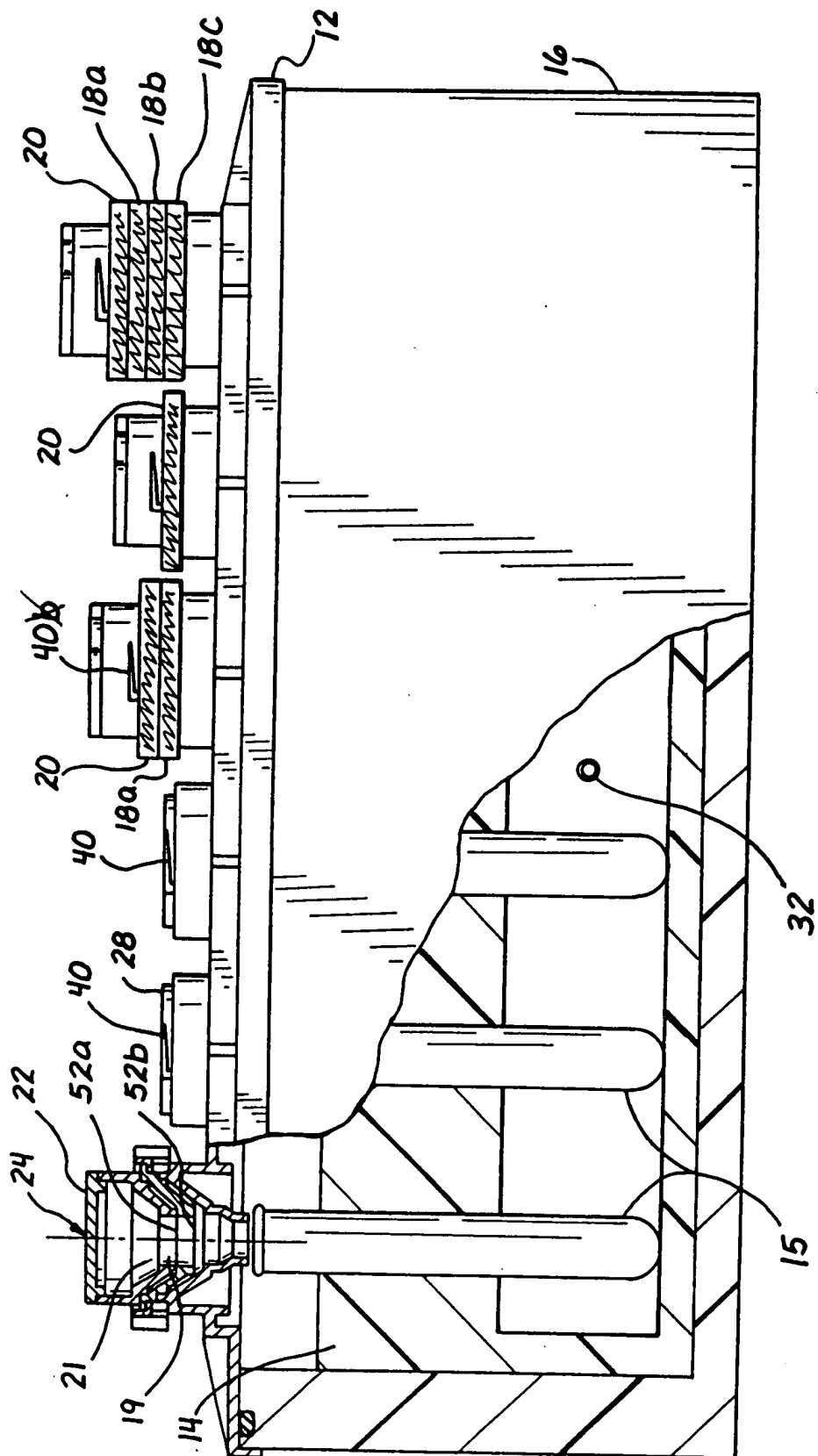


Fig. 6

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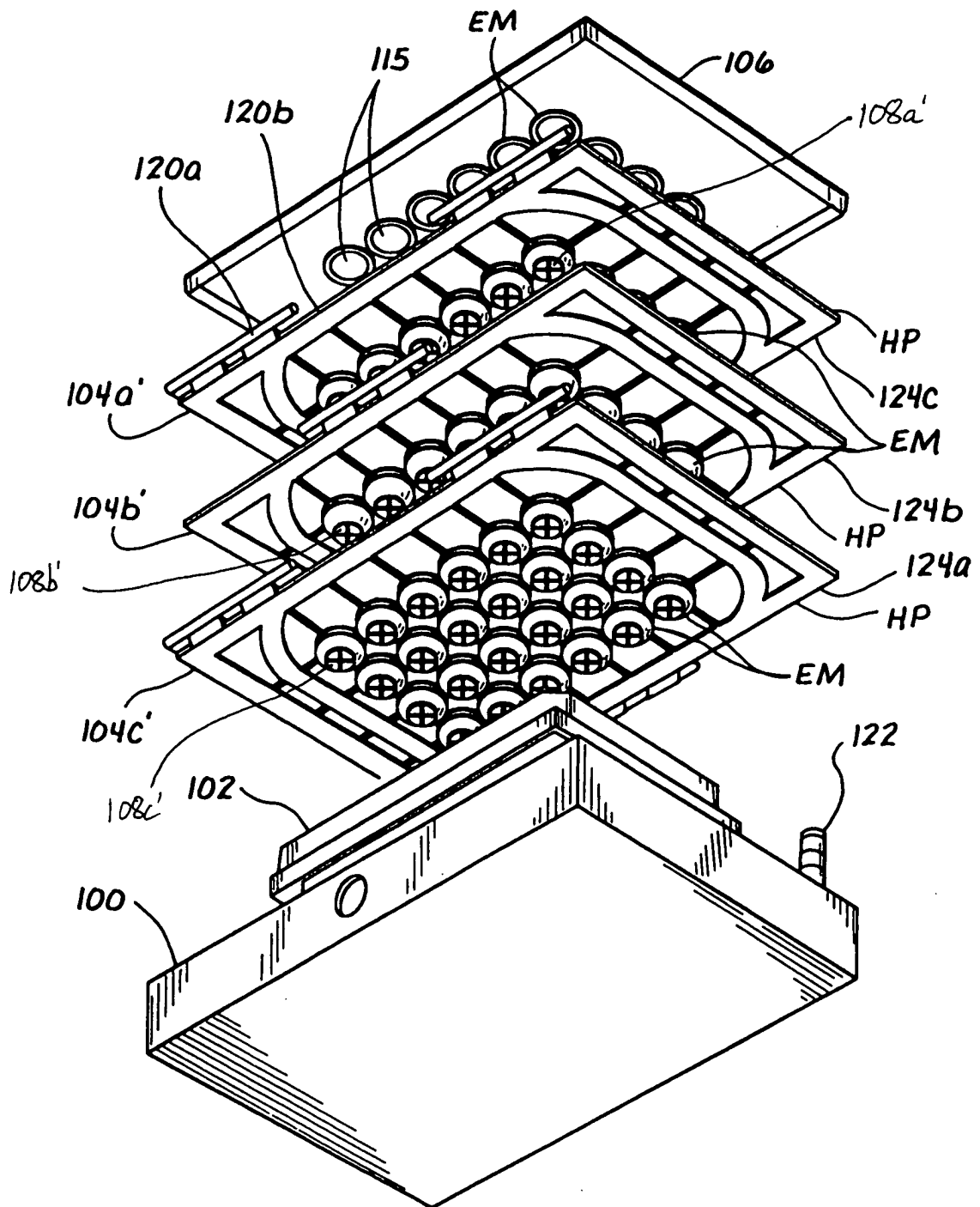


Fig. 10a

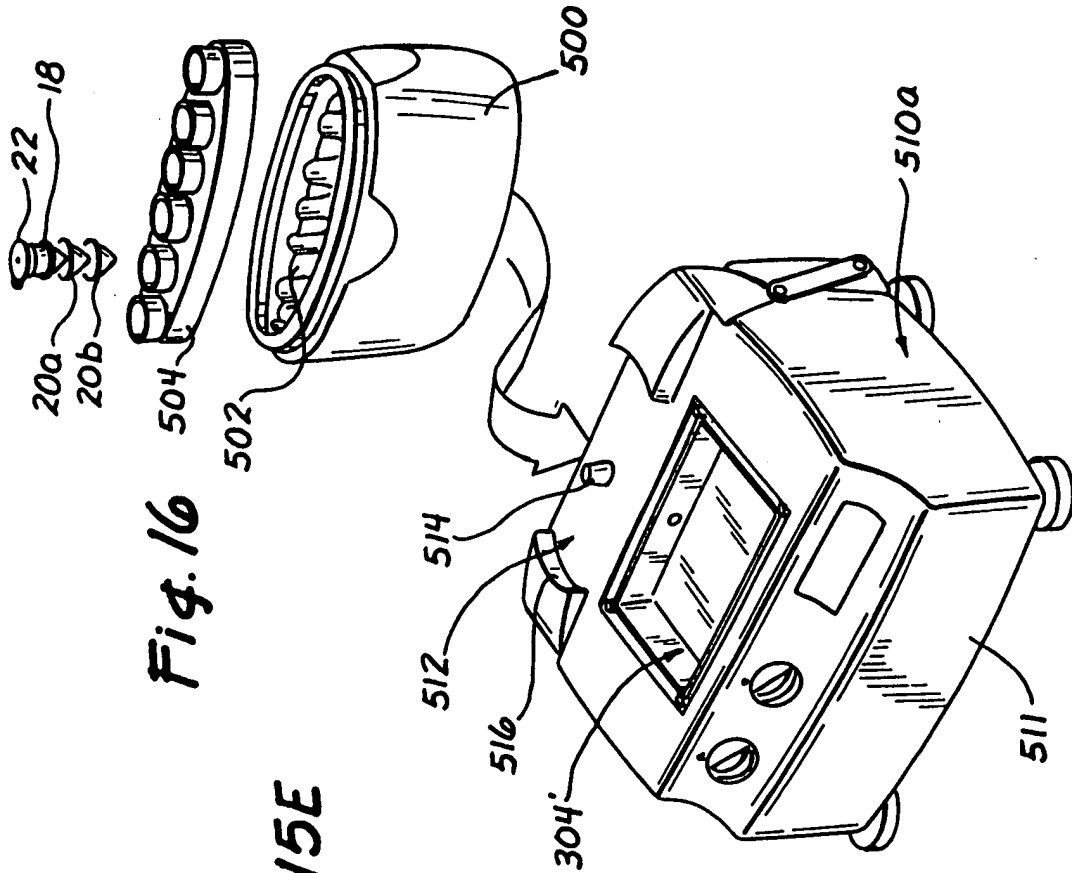


Fig. 16

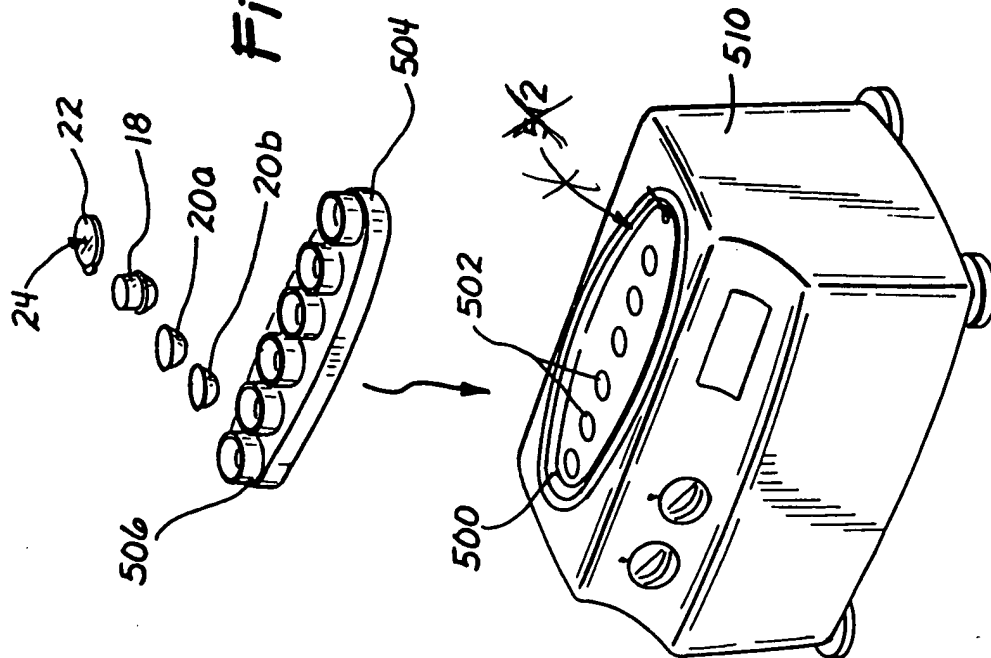


Fig. 15E

TABLE 1

Appendix I

1. New Tests

Analytes	Typical Matrix	Membranes				Reagents				Detection Method	Comments	
		M ₁	M ₂	M ₃	M ₄	R ₁	R ₂	R ₃	R ₄			
1. FFA*, FFA*	Oil Fish Bakery Fast Food Oil in Frying	With or without any other analytes or membrane MCE .45 or Durapore .45 to remove particulates				XO					Spectral 570 or (visual) or color wheel	
2. LPO/FFA	Oil or olive	MCE	Nylon linked decylol polymers or silica to bind LPO			XO	XO and Fe ⁺ (acidified)				Spectral Spectral	
3. LPO/FFA*	Oil	MCE	Silica			XO	reduced hemoglobin					
4. LPO/FFA/MDA	Oil/Seafood	MCE	Silica	Diethylamine		XO	XO (Fe ⁺ Acidified)	MI			Spectral	
5. LPO, MDA, FFA after oxidative stress	Oil	MCE	Silica	Diethylamine		XO	XO (Fe ⁺ Acidified)	MI			% change proportional to shelf life Use visible meat Color change	
6. LPO, MDA, FFA After oxidative stress	Oil Fish Bakery	MCE to remove particulates	Silica to bind LPO	Diethylamine to bind MDA		XO	XO (Fe ⁺ acidified)	MI			Spectral	
7. LPO after oxidative stress	Fish Oil	MCE	MCE			XO (Fe ⁺ acidified)					Spectral	

Fig. 18A

1. New Tests

Analytes	Typical Matrix	Membranes				Reagents				Detection Method	Comments
		M ₁	M ₂	M ₃	M ₄	R ₁	R ₂	R ₃	R ₄		
8. FFA after Oxidative Stress	Oil	MCE				XO				Spectral	
9. Polyphenol/LPO	Oil, Olives, Fruit, vegetables	MCE	Silica to bind LPO			Folin (Cocaltau)	XO (Fe ⁺ acidified)			Spectral	
10. Polyphenol	Oil	MCE				Folin (Cocaltau)				Spectral	
11. Polyphenol and FFA	Oil Fruit Vegetables	MCE	Carboxymethyl to bind Polyphenol			XO	Folin Cocaltau			Spectral	
12. Polyphenol MDA/LPO/FFA	Oil Fruit Vegetable	0.8 um to bind particulates	Silica or nylon with lipid solubilizing decalyl to bind LPO	Carboxymethyl weakly acidic membrane to bind polyphenols	diethylamine to bind MDA	XO	XO (Fe ⁺ acidified)	Folin (Cocaltau)	MI	Spectral	
13. LPO Ratio for Antioxidant Status	Oil Fish	MCE				XO/Fe ⁺ acidified				Spectral	
14. Unsaturated linkage/LPO Value	Oil	MCE	Lipid solubilizing polymer attached nylon bind LPO			I ₃ → I ₂	XO (acidified Fe)			Spectral	
15. Unsaturated linkage, MDA	Oil	MCE	diethylamine			I ₃ → I ₂	MI			Spectral	
16. LPO, FFA, Histamine*	fish beverage	MCE	Sulfonic Acid	Silica		XO	DAO and XO/Fe ⁺ acidified	XO (Fe ⁺ acidified)		Spectral	

Fig. 183

1. New Tests

Analytes	Typical Matrix	Membranes				Reagents				Detection Method	Comments
		M ₁	M ₂	M ₃	M ₄	R ₁	R ₂	R ₃	R ₄		
17. LPO/FFA/MDA	Fish beverage	MCE for particulates	Diethylamine to bind aldehydes for MDA	Lipid solubilizing polymer bound nylon to bind LPO		XO test for FFA	MI test for MDA	XO Fe ⁺⁺ acidified LPO		Spectral	
18. LPO/Histamine**	fish cheese sausage	MCE	BioCyne C or Sarobind Q for histamine binding			XO Fe ⁺ acidified	diamine oxidase and XO Fe (acidified)			Spectral	
19A. Polymer vs. non-polymer triglycerides	Cooking Oils	Membrane with MW Cutoff 500				Lipase with glycerol kinase +	detect H ₂ O ₂ with chromogen			Spectral	
19B. Polymer vs. non-polymer Oxidized trigly	Cooking Oil	MW cutoff 500				Lipase/glycerol 3 PO ₄ oxidase				Spectral	
20. Mycotoxin1, Mycotoxin2 Mycotoxin 3	Grain	MCE	mab ₁ bound NH ₂ on regen cellulose	mab ₂ bound NH ₂ on regen cellulose	mab ₃ bound NH ₂ on regen cellulose	Mycotoxin1 enzyme conjugate	Mycotoxin2 enzyme conjugate	Mycotoxin3 enzyme conjugate (peroxidase mycotoxin conjugate) Measure H ₂ O ₂ produced		Spectral	
21. MDA/Sulfide	beer wine	MCE Prefilter or verapapor prefilter	IDA to remove pigment and metals	Sarobind Q to bind aldehydes		Fe ⁺³ (XO) ↓ Fe ⁺² (XO) blue → yellow For sulfide	MI for MDA			Spectral	
22. ATP Separation from ADP & AMP	fish other living material degradation	MCE Prefilter or negative adsorber	Diethylamine			ATP detected by bioluminescence detection huminol	ADP + AMP by bioluminescence detection huminol			Spectral	

Fig. 18C

1. New Tests

Analytes	Typical Matrix	Membranes				Reagents				Detection Method	Comments
		M ₁	M ₂	M ₃	M ₄	R ₁	R ₂	R ₃	R ₄		
23. Histidine/Histamine	fish	MCE	Carboxymethyl to bind histamine			TRPB detect histidine Tetrabromophenol blue	DAO + HRP + Methylene blue Detect Histamine			Spectral	
24. Histamine	wine, fish	1 minodi acetic acid to (bind pigment) remove metals	IDA membrane to bind metal			DAO + XO Fe ³⁺ acidified				Spectral	
25. Separation histamine* from all rest amines	Fish Sausage Cheese	1 minodi acetic acid remove metals	Sulfonic acid membrane bind other amines			DAO + XO Fe ³⁺ acidified	measure rest amines using Xyldyl blue			Spectral	
26. Total Polar Compounds	Cooking Oil	Silica to bind polar				quantize non-polar lipase and	quantize polar lipase ***			Spectral	
27. Total Polar Compounds	Cooking Oil	Bind non-polar to hydrophobic membrane				quantize polar ***	quantize non-polar ***			Spectral	
28. FFA or biliary acids	plasma or serum cows, humans	MCE to remove rbc etc. lipo proteins				XO to test for FFA				Spectral	

* Proprietary

** After Stress

*** lipase → glycerol and ATP → glycerol kinase and pyruvate kinase lactate dehydrogenase

* called acidity value fish, bakery, wine

Fig. 181

Analytes	Typical Matrix	Membranes					Reagents				Detection Method	Comments
		M ₁	M ₂	M ₃	M ₄		R ₁	R ₂	R ₃	R ₄		
Polyphenol/FFA for prediction of adulteration	Oils	MCE					XO	Folin Ciocalteu			Spectral	
	Polyphenol/FFA											
LPO to predict adulteration & aging	Oils	MCE	Carboxymethyl to bind polyphenol	Silica			XO	XO (Fe ³⁺ acidified)	Folin Ciocalteu		Spectral	
Polyphenol/FFA to predict adulteration	Oils	MCE	Carboxymethyl				XO	Folin Ciocalteu			Spectral	
LPO/MDA/Acidity Irradiation	Oils Fish	MCE	Silica	diethylamine			XO	XO Fe ³⁺ (acidified)	MI		Spectral	
To Predict time for mycotoxin growth	grain	MCE					XO (Fe ³⁺ acidified)				Spectral	
FFA distribution	Oil predigested with lipase	MCE	Mab ₁ to Oleic	Mab ₂ Stearic	Mab ₃ Linoleic		XO	XO	XO		Spectral	Same ratio predict oil type oleic/stearic/linoleic
Polyphenol/FFA/TG	Oil	MCE	Strong acid sulfonic bind ROH ⁺	Lipid solubilizing polymer bound nylon to lipid peroxides			XO	Folin Ciocalteu for polyphenol	Enzymatic determination triglyceride = TG with lipase as in 19A		Spectral	
Anionic	Beer	MCE	IDA				flush Fe Cl ₃ replace anions change color				Spectral	
Aldehyde, bisulfites	Beer	MCE	diethylamine				Fe ³⁺ (XO) reduced by bisulfite	MI			Spectral	
Protein, aldehyde	Beer	MCE	diethylamine				Commauxie Blue for protein	MI			Spectral	

Fig. 18E

Analytes	Typical Matrix	Membranes			Reagents				Detection Method	Comments
		M ₁	M ₂	M ₃	M ₄	R ₁	R ₂	R ₃	R ₄	
50. Tetracycline Antibiotics in milk	Milk	MCE	decanyl coated membrane			direct read at 365 nm				365nm Spectral
51. Aflatoxin	Milk and Aflatoxin Conjugate	MCE				Enzyme substrate = peroxidase aflatoxin conjugate and urea peroxide and tetramethylbenzidine chromogen				Spectral

PPO - Polyphenol

Fig. 18F

Others

Analytes	Typical Matrix	Membranes			Reagents				Detection Method	Comments
		M ₁	M ₂	M ₃	M ₄	R ₁	R ₂	R ₃	R ₄	
52. Microbes	Food	Versapor Particulates	IGN-4 binds microbes			Direct				Reflectance
53. Metals	Food	Versapor Particulates	IDA to bind Metal			Test for metals Zinc Zinc + Metal → deep blue				Spectral

Analytes	Typical Matrix	Membranes			Reagents				Detection Method	Comments
		M ₁	M ₂	M ₃	M ₄	R ₁	R ₂	R ₃	R ₄	
54. Any Analytes	Food	Stacked bundle 8, 45 of M1 + M2++								Spectral

**Laminated



DEAE Cellulose
Nylon

Fig. 186

2. Chemical /Personal Care

LPO Reagent Only

	Analytes	Typical Matrix	Membranes				Reagents				Detection Method	Comments
			M ₁	M ₂	M ₃	M ₄	R ₁	R ₂	R ₃	R ₄		
1	LPO, FFA, and MDA	Fragrance Oil	MCE	diethylamine	Silica		XO		MI	XO (Fe ⁺ acidified)	Spectral	
2	LPO after oxidative stress to predict shelf life	Oil	MCE						XO (Fe ⁺ acidified)		Spectral	
3	LPO after UV exposure to determine SP or UVA	Skincare Product	MCE						XO (Fe ⁺ acidified)		Spectral	Test to UVA
4	LPO after stress formulation	Biological matrix cells	MCE						XO (Fe ⁺ acidified)		Spectral	Test efficacy
5	LPO	Formulation with or without stress; compare formulation Trolox	MCE						XO (Fe ⁺ acidified)		Spectral	Test efficacy
		Oxidative stressed cells digest	Versapor						XO (Fe ⁺ acidified)		Spectral	Oxidative stress production mode of action

Stress "toxicant" take sample before and after stress

Fig. 18H

3. Medical

Analytes	Typical Matrix	Membranes			Reagents				Detection Method	Comments
		M ₁	M ₂	M ₃	M ₄	R ₁	R ₂	R ₃	R ₄	
1. VLDL LDL HDL	Serum	Membrane 300,000 MW trap VLDL	Membrane 100,000 MW cut-off trap LDL	Membrane 10,000 MW cut-off trap HDL		quant VLDL cholesterol (Use cholesterol oxidase and substrate)	LDL cholesterol detection	HDL cholesterol		Spectral 510
2. LDL and oxidized LDL (LDL)	Serum	300,000 MW cut-off membrane	LDL- Trapped diethyl amine			LDL cholesterol detection	Riae LDL- Cholesterol detection oxidized			Spectral 510
3. LPO to determine AOS	Serum	MCE				XO Fe ²⁺ Acidified				Spectral
4. LPO in serum to determine age	Serum	MCE				XO Fe ²⁺ Acidified				Spectral
5. FFA	Serum	MCE				XO				Spectral

Fig. 182

~~Appendix II~~

TABLE II

Key to Acronyms

AOS.....	Antioxidant Status
ADP	Adenosine Triphosphate
AMP	Adenosine Monophosphate
ATP	Adenosine Triphosphate
DAO	Diamine Oxidase
FFA	Free Fatty Acids
HA	Histamine
HDL	High Density Lipoproteins
HRP	Horseradish Peroxidase
I ₂	Iodine Vapor
I ₃	Triiodide Ion
IDA	Iminodi Acedtic Acid Membrane
LDL	Low Density Lipoproteins
LDL-.....	Oxidized Low Density Lipoproteins
LPO	Lipid Peroxides
Mab.....	Monoclonal Antibody
MCE	Mixed Cellulose Ester
MDA	Malonaldehydes
MI	Methylindole
SP	Sun Protector Factor
TBPB	Tetra Bromophenol Blue
TG	Triglyceride
TL	Total Lipids
SF	Sulfite
VLDL	Very Low Density Lipoproteins
XO	Xylenol Orange

FIG. 19

TABLE III
Appendix III

<u>SHLEICHER & SCHUELL, GmbH</u> P.O. Box 4, D37582, Dassel, Germany	<u>APPLICATION</u>
1. Cellulose Acetate, 0.45 um's 25 mm discs - 23710	Removal of solid matter, proteins > .45 mm
2. Polyvinylidene Fluoride, 0.2 um's, 25 mm disks - 413005	Removal of solid matter, proteins
3. NA45 DEAE Cellulose Membrane, 0.45 um's, 25 mm discs - 23310	Antibody coating
4. NA45 DEAE Cellulose Membrane, 0.45 um's, 4x5 1/4 inches - 23430	Capture aldehydes
5. Nylon, 0.45 um's, 25mm discs - 00130	Capture of malonaldehyde, sulfites, sulfite-bound aldehydes
6. Nylon, 0.2 um's, 25 mm discs - 00030	Removal of solid matter, proteins > .45 mm
7. NL Polyamide	Removal of solid matter, proteins > .2 mm
8. PC Polycarbonate	Capture organohalides
	Capture aldehydes
<u>Poretics Coporation</u> 111 A Lindbergh Ave., Livermore, CA 94550	<u>APPLICATION</u>
1. MicroPrep, PTFE, PP, NS, 0.2 um's, 13 mm - 97844	Capture compounds having fatty acid chains lipid peroxides
2. MicroSpin, Nylon, 0.45 um's, Micro-Cent. tubes - 97795	Removal of solid matter, proteins
3. Ultra-Spin, CTA, PP S, 10k MWCO, Micro-Cent Tubes - 97771	Removal of solid matter, proteins
4. Silver Membranes, 0.4 um's, 25mm - 51133	Capture of volatiles
5. Polycarbonate Membranes, 0.4 um's, 25 mm, PVP Free - 11030	Capture aldehydes
6. Polycarbonate Membranes, 0.4 um's, 25 mm, AOX - 11027	Capture chlorinated molecules
7. Polycarbonate Membranes, 0.45 um's 47 mm, Low extr. - 13035	Capture aldehydes
8. Polycarbonate Membranes, 0.2 um's, 8" x 10", PVP Free - 19416	Capture aldehydes
<u>MILLIPORE CORPORATION</u> 80 Ashby Rd., Bedford, Ma 01730-2271	<u>APPLICATION</u>
1. Isopore, 0.1 um's, 25 mm discs - VCTP 025 00	Removal of solid matter proteins
2. Immobilon-CD, 0.45 um's, 25mm discs, Cationically charged (hydrophilic PVDF) - ICDM 025 00	Removal of solid matter proteins
3. Low water Extractable (TF) filters, 0.45 um's, 25 mm discs - HATF 025 00	Removal of solid matter without binding organic molecules
4. Hydrophilic Durapore, 0.45 um's, 25 mm discs - HVL-025 00	Removal of solid matter proteins
5. Immobilon (hydrophobic PVDF) high protein binding, 0.45 um's, 25 mm discs - ISEQ 025 00	Capture aldehydes
6. Isopore, HTTP (polycarbonate), 0.4 um's, 25 mm discs - HTTP 025 00	Capture aldehydes
7. Immobilon-P Transfer Membranes (PVDF), 0.45 um's, 15 cm x 15 cm - IPVH 151 50	Coating with antibodies to capture or remove antibody specific compounds
8. Immobilon Transfer Membranes (PVDF), 0.45 um's, 15 cm x 15 cm - ICDM 151 50	Coating with antibodies to capture or remove antibody specific compounds
9. Immobilon NC Pure, 0.22 um's, 15 cm x 15 cm - INCP 151 50	Coating with antibodies to capture or remove antibody specific compounds
10. Immobilon-NC (Surfactant free), 0.45 um's, 15 cm x 15 cm HATF 151 50	Coating with antibodies to capture or remove antibody specific compounds
11. MultiScreen - DEAE Anion Exchange Paper Opaque 96 well plates - MADE NO8 10	Capture aldehydes
12. MultiScreen - Phospho Cellulose Cation Exchange Paper Opaque 96 well plates MAPH NO8 10	Bind lipid peroxides for capture
13. SC X	MW Cutoffs timer polymers triglyceria
14. Polysulfone	Amino acids, peptides proteins
15. IGN-6	Microbes
16. ICE 450	Bind nucleotides DNA
<u>Sartorius</u> 131 Hearland Blvd., Edgewood, NY 11717	<u>APPLICATION</u>
1. Sartoband S	Bind monoclonal antibodies, etc.
2. Sartoband C	Exdotoxin removal
3. Sartoband Q	Separate proteins anines
4. Sartoband D	DNA ADP ATP AMP
5. Sartoband IDA	Metals; cations
<u>Gelman/Pall</u> 600 South Wagner Road, Ann Arbor, MI 48103-9019	<u>APPLICATIONS</u>
1. Versapor	Prefilter contaminants
2. Ultrabind 05450	Bind monoclonal antibodies, etc.
3. Biodyne C	Separation proteins
4. Biodyne B+	Endotoxins nucleotide separation

FIG. 20

~~Appendix IV~~

TABLE IV

Predictive Algorithms

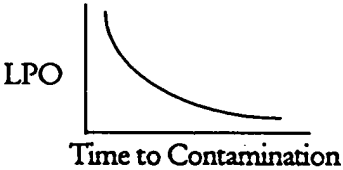
1.	Prediction of Olive Oil Adulteration using product FFA X Polyphenol Please refer to row 29 of Appendix I.	FFA X Polyphenol = Numerical Scale > 50 not adulterated < 50 likely adulterated
2.	Shelf Life Prediction based on MDA/LPO ratio	MDA/LPO is a scale 0 to 5 0-0.5 67% shelf life remains 0.5-1 33% shelf life remains 1-2 15% shelf life remains > 2 5% shelf life remains
3.	Shelf Life Prediction based stress with peroxy generator	% change related to shelf life 0-10% > 18 months 10-30% 12-18 months 30-50% 6-12 months >50% < 6 months
4.	Freeze/Thaw Prediction using ratio Acidity/LPO	Ratio Freeze/Thaw 0-0.2 one 0.2-0.4 two 0.4-0.6 three 0.6-0.8 four
5.	Prediction of time to Mycotoxin contamination using LPO value Please refer to row 33 of Appendix I.	
6.	Prediction if food is Irradiated using FFA/LPO ratio	Food non-irradiated has expected FFA/LPO of <1 Food Irradiated increases FFA/LPO >1

FIG. 21